NON-PUBLIC?: N
ACCESSION #: 9507060102
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Fermi 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000341

TITLE: Main Turbine Trip Due to False Overspeed During
Mechanical Overspeed Test
EVENT DATE: 06/02/95 LER #: 95-006-00 REPORT DATE: 06/30/95

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 095

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
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Engineer

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

During the performance of test procedure 27.112.03, "Turbine Generator Mechanical Overspeed On Load Test" on June 9, 1995 the main turbine tripped, causing a reactor scram at 1636 hours. During testing of the number 1 trip ring, the number 2 trip mechanism unexpectedly actuated. This caused a turbine trip causing a reactor scram on turbine control valve fast closure. All control rods fully inserted. The subsequent reactor water level 3 actuated isolation logic for selected primary containment isolation valves as expected. All safety related equipment performed its intended safety function. At 1648 hours, reactor water level was restored above level 3, and the plant was stabilized.

The main turbine tripped because the test on the number 1 trip ring sufficiently vibrated the number 2 trip lever when the "On Load Overspeed Test" pushbutton was depressed causing the number 2 trip mechanism to

actuate. This occurred because the number 2 trip lever had not fully latched into its reset state during the performance of the actual overspeed test 27.112.01 on May 4, 1995. Procedure 27.112.01 was revised to incorporate holding the reset overspeed pushbutton depressed for at least 15 seconds.

END OF ABSTRACT

Table "REQUIRED NUMBER OF DIGITS/CHARACTERS FOR EACH BLOCK" omitted.

Initial Plant Conditions:

Operational Condition: 1 (Power Operation)
Reactor Power: 95 Percent
Reactor Pressure: 1023 psig
Reactor Temperature 540 degrees Fahrenheit

Description of the Event:

On June 2, 1995 at 1636 hours the main turbine (TA) tripped resulting in a reactor scram during the performance of procedure 27.112.03, "Turbine Generator Mechanical Overspeed On Load Test". The Control Room Nuclear Supervising Operator (NSO) (Utility - Licensed)! had completed steps 5.1 through 5.3 of the procedure for selecting the on load test and isolating the number 1 trip ring of the main turbine. When the NSO depressed the "On Load Overspeed Test" pushbutton (step 5.4) for the number 1 trip ring, both the number 1 and 2 trip mechanisms actuated immediately. Since only the number 1 trip ring was isolated for this portion of the test, the main turbine tripped on the number 2 mechanical overspeed protection. This caused a reactor scram on turbine control valve (ISV) fast closure, as designed.

All control rods (AA) fully inserted. Reactor pressure increased from 1023 to 1077 psig, and reactor water level decreased from 196 inches past the level 3 setpoint of 173 inches, as expected, to 129 inches above the Top of Active Fuel (TAF). Reactor water level was maintained between Level 2 (110.8 inches above TAF) and Level 8 (214 inches above TAF). The reactor water level 3 actuated isolation logic for primary containment isolation valves (ISV) group 4 Residual Heat Removal System, gr
up 13
Drywell Sumps, and group 15 Traversing In-Core Probe System. The Drywell

Sump valves closed on the isolation logic. The Residual Heat Removal and Traversing In-Core Probe System valves were already closed. All safety related equipment performed its intended safety function. At 1648 hours, reactor water level was restored above level 3, and the plant was stabilized.

Cause of the Event:

Test procedure 27.112.03 is designed to test one trip ring while the other trip ring provides mechanical overspeed protection. The trip rings and linkages are in close proximity yet not in physical contact. The number 2 trip ring was in service when the problem occurred. The main turbine tripped because the test on the number 1 trip ring sufficiently vibrated the number 2 trip lever linkage so as to unseat it. This occurred because the number 2 trip lever was not fully latched onto the movable fulcrum lever.

On May 4, 1995 for post maintenance testing, test procedure 27.112.03 was successfully performed. Then test procedure 27.112.01, "Actual Overspeed Trip" was performed successfully for the number 2 trip ring. During test 27.112.01 the reset pushbutton was depressed following actuation of the overspeed trip, porting oil from the main lube oil system (LL) to a reset piston. If the reset pushbutton is released too soon by the operator, the trip condition indication can be cleared without sufficient displacement of the reset piston to fully relatch the trip lever. It is possible for the trip linkage to not fully relatch yet latch sufficiently to allow for Control Room indication that the linkage is latched. The linkages can latch sufficiently to continue to operate.

The turbine vendor operating manual describes overspeed testing with the Generator not synchronized (i.e., actual) and with the generator synchronized. This manual requires the reset overspeed pushbuttons to be depressed and held down at least 5 seconds then released for both tests. Contrary to this vendor recommendation, procedure 27.112.01 did not require the reset pushbutton to be depressed and held down for any specific length of time. Field testing determined that depressing the overspeed reset pushbutton for durations between 0.5 and 2 seconds can result in an incomplete latching of the turbine overspeed trip lever.

Analysis of the Event:

The equipment and components actuated during this event performed their intended safety functions. The subsequent scram of the reactor and plant shutdown was according to design. Chapter 15 of the Updated Final Safety

Analysis Report (UFSAR) bounds this event in section 15.2 for an increase in reactor pressure on Turbine/Generator trip and

subsequent reactor scram. UFSAR figure 15.0-8 for a Turbine/Generator trip with the turbine bypass out of service also bounds this event. On June 2, 1995 the turbine bypass performed as designed and the transient was less severe than the UFSAR described transient. Neutron flux increased from 95 to 96 percent. The UFSAR bounds the event from 100 to greater than 150 percent for instantaneous power. Reactor pressure increased approximately 55 psig. The UFSAR bounds the event for an increase of up to 170 psig. Following the scram, reactor water level decreased 67 inches. The reactor water level was maintained above the low level setpoint (110.8 inches above TAF, L2), and below the high level setpoint (214 inches above TAF, L8) to avoid isolations associated with the level 2 and 8 setpoints.

Corrective Actions:

Procedure 27.112.01 was revised to incorporate holding the overspeed reset pushbutton depressed at least 15 seconds. This assures a positive and complete latch of the mechanical overspeed linkages.

Improvements were made to the hardware to assure complete latching of the mechanical overspeed linkages. The trip lever and the movable fulcrum lever were reconditioned, and the contact surfaces between the two levers were hardened. Limit switches were adjusted such that the backlights on the control panel provide more assurance that a complete latch of the mechanical linkages is achieved. Test procedures 27.112.01 and 27.112.03 were successfully performed following the improvements.

Previous Similar Events:

Licensee Event Report (LER) 89-006 for a turbine trip/reactor scram due to a design deficiency in the turbine overspeed reset is similar in that the turbine trip / reactor scram occurred during surveillance 27.112.03.

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